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Off to Space for a Year, an American's Longest Journey

Source: Kenneth Chang, *New York Times*, March 26, 2015

When Scott J. Kelly goes up to the International Space Station — he and two Russian astronauts are scheduled to launch on Friday — he will not come back down again for a year.

That year is to be the longest space mission a NASA astronaut has ever undertaken. This trip — Mr. Kelly's fourth to space — will also push him to the top in cumulative time in space among NASA's astronauts. When he lands in March 2016, he will have spent more than 500 days of his life floating in orbit, including a 159-day trip to the space station that ended in 2011.

With his trip this time twice as long, "my expectation is that it'll be more challenging and, as a result, more rewarding," Mr. Kelly, 51, said in a recent interview.

Like all travelers to the space station since the retirement of NASA's space shuttles in 2011, Mr. Kelly and the two Russians, Mikhail Kornienko and Gennady Padalka, will be launching on a Russian Soyuz rocket from the Baikonur Cosmodrome in Kazakhstan. Liftoff is scheduled for 3:42 p.m. Friday Eastern time, which is 1:42 a.m. Saturday in Baikonur. The Soyuz capsule will dock at the space station about six hours later.

Until now, stays at the International Space Station have lasted about six months. In the 1980s and 1990s, Russian astronauts made longer trips to the Mir space station. NASA scientists hope to learn more about the physical and psychological toll of long space missions, including the effects of factors like weightlessness and radiation on bones, the circulatory system and muscles.

"All of those things really affect the bodies of astronauts," Julie A. Robinson, NASA's chief scientist for the space station, said during a news conference in January. "They push them to something not at all unlike aging on Earth, where their balance is disrupted, their hearts are weaker, their immune system isn't functioning as well, their muscles are weaker and their bones are being lost."

That is part of the groundwork NASA wants to complete before it would be ready, in a couple of decades, to send astronauts to Mars.

"We're doing this so that we can mitigate those effects, so we can eventually go beyond low-Earth orbit one day and explore further than we've gone before," Mr. Kelly said.

NASA scientists will see whether Mr. Kelly's experience differs from his earlier trip, especially during the second six months. They will also conduct experiments comparing his health to that of his twin brother, Mark Kelly, a retired NASA astronaut, on Earth.

"Mark will participate as a sort of a ground control to really help us understand this nature-versus-nurture question," Dr. Robinson said.

Mr. Kornienko will also remain in the space station for a year, but he will not set any Russian space records by doing so. In 1995, Valery Polyakov set the world's record for longest single stay in space at nearly 438 days when he returned from Mir.

However, Mr. Padalka, who will be spending the typical six months at the space station, will set a record, for the most total time by any astronaut in space, about 878 days. A retired Russian astronaut, Sergei Krikalev, is the current record-holder, with 803 days.

Mr. Kelly said that during his year off the planet he thought he would miss the same things he missed last time. "The human connection with your friends and family," Mr. Kelly said. "Getting away from work. Going outside."

He described the space station as a "magical place," but added, "You never get to leave."
What does a \$250,000 ticket to space with Virgin Galactic actually buy you?

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What Does a \$250,000 Ticket to Space with Virgin Galactic Actually Buy You?

Source: Daisy Carrington, CNN.com

For decades, none but a few privileged -- and highly trained -- individuals could dare dream of traveling beyond Earth's orbit. All that's set to change as Richard Branson brings space exploration to the (mega-rich) masses.

In April, Virgin Galactic -- a subsidiary of Branson's Virgin Group -- hit a milestone. The rocket motor the company had been testing on the ground was fitted into SpaceShip Two, the spacecraft that, from next year onwards, will bring space travel to the general public.

"We lit the rocket motor for the first time in the air and the spaceship went through the sound barrier," recalls Stephen Attenborough, Virgin Galactic's commercial director.

"It was a hugely significant milestone for us, and in many ways, the last big piece of the jigsaw."

Though a ticket aboard SpaceShip Two doesn't come cheap -- a seat currently costs \$250,000 -- Attenborough maintains that as things stand, the fare is a relative bargain.

"It's still about 1% of the price you would have needed to pay to go to space as a private citizen before now," maintains Attenborough. Indeed, in the past, the privilege cost civilians a fair share. When Dennis Tito, the world's first "space tourist" bought a seat aboard a Russian Soyuz spacecraft in 2001, it allegedly cost him nearly \$20 million.

Though flights won't commence until next year at the earliest, Virgin Galactic has already sold 640 seats to space enthusiasts the world over. For some, the cost is negligible. Others, though, have taken second mortgages on their homes to pay for the tickets.

So what does \$250,000 buy you?

The experience starts with three days of training at Spaceport America in New Mexico.

"There's a lot to do with getting you psychologically prepared for a trip that is absolutely about sensory overload," says Attenborough.

The flight itself accommodates six passengers, lasts two and a half hours, and culminates with congratulatory champagne at the spaceport. Space travelers get to leave their seats to experience several minutes of zero-gravity, and perhaps the most iconic view ever afforded mankind.

"Ultimately, you get memories to last a lifetime -- a trip I think will just blow people away. When talking to professional astronauts of the past, they don't talk about (their experiences) for a day or a year, they talk about it for the rest of their lives."

Still, there are many enthusiasts eager to see the price drop, not the least of whom is American astronaut Buzz Aldrin. Aldrin recalls the first time he heard the concept of private space travel debated in a meeting room 25 years ago.

"Somebody said, 'How are we going to select (who gets to fly to space)?' Someone in the back of the room said, 'How about a lottery?' Man, my ears perked up at that, and I became a devotee of a lottery to select people."

The civilian lottery is the basis of Aldrin's non-profit, SpaceShare.

"I wasn't interested in a big pay-off of the profit made. I was interested in exposing space to a large number of people," he says.

Attenborough himself is eager to see the price drop.

"This is not just a business for Virgin. It's about the creation of a new and important industry that is going to transform space access. One of the byproducts of that is there will be competition, there will be economies of scale, and we should see the price go down," he says.

"Hopefully there will be a large, thriving, vibrant industry that will make it possible for most people to go into space in my lifetime."

Possible Response Questions:

- Do you believe future generations will travel to Mars? Explain.
- If you could afford it, would you pay to be one of the first space tourists? Explain.
- Select any passage and respond to it.